**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Proposed Comments Resolution for 15.4ab D2.0 Sensing Comments**  |
| Date Submitted | July 2025 |
| Sources | Pooria Pakrooh (Qualcomm)  |  |
| Abstract | Resolution to comments: 122, 246, 247, 248, 249, 279, 589, 592, 593, 588, 590, 591, 594, 601, 602, 607, 609, 610, 653 |
| Purpose | To propose comments resolution for “P802.15.4ab™/D (pre-ballot) C Draft Standard for Low-Rate Wireless Networks”  |
| Notice | This document does not represent the agreed views of the IEEE 802.15 Working Group or IEEE 802.15.4ab Task Group. It represents only the views of the participants listed in the “Sources” field above.It is offered as a basis for discussion and is not binding on the contributing individuals. The material in this document is subject to change in form and content after further study. The contributors reserve the right to add, amend or withdraw material contained herein. |

CIDs addressed: 122, 246, 247, 248, 249, 279, 589, 592, 593, 588, 590, 591, 594, 601, 602, 607, 609, 610, 653

Updates in Rev 1:

Added extra clarification to resolution for comments 246, 589 and 592.

Updates in Rev 2:

Two comments removed for further discussion: 104 and 120

Comment 248: Accepted changed to revised due to a typo in the resolution

***Comment Indices 246, 589, and 592 in 15-24-0174-30-04ab-consolidated-comments\_draft\_1.0***

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| **CID** | **Name** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 246 | PAKROOH, POORIA | 10.40.4.5.1 | 149 | 16 | Measurement report is mandatory when the controller is the transmitter of the Sensing PPDU.  | Remove the word "Optional". Also, Add a sentence: "When the controller is acting as the transmitter, sensing report phase is mandatory" |
| 589 | VERSO, BILLY | 10.40.4.5.1 | 149 | 17 | I think the NHL (sensing protocol/application) may be implicated in processing the CIR and senting the data frame incoprorating the CIR Report IE, so should reword this. Also the line above says it is an optional phase, so how can the report be mandatory if the phase isnt' | Change "An SDEV shall support a ..." to "The basic sensing report is a..." |
| 592 | VERSO, BILLY | 10.40.4.5.3.2 | 150 | 20 | Again maybe there is a better way to describe than mandatory, (since over-the-air reporting is optional.) | change "mandatory" to "fundamental" in the context of this bitmap style reporting. |

**Discussion:** Sensing functionality is about sensing the environment via a CIR report. Without a CIR report, the sensing task is incomplete. There are two scenarios for bi-static sensing:

1. The controller is the receiver of sensing PPDU: No OTA CIR report is required, as the controller is the device generating the CIR.
2. The controller is the transmitter of sensing PPDU: OTA CIR report is required, as the controlee is the device generating the CIR, and should transmit the report to the controller.

Therefore, OTA CIR report, and the report phase, are conditionally mandatory. This is reflected in subclause 10.40.2, P147L21, regarding mandatory report. The text regarding report phase should match this as well:

“For the case where the sensing controller is the sensing transmitter, a sensing measurement report shall be sent by the sensing controlee to provide the measurement report to the sensing controller.”

**Resolution:**

1. CID 246 and 589: Revised
2. CID 592: Reject

**Notes to Editor:**

**Change page 149, line 16 as follows:**

“A measurement report phase follows the sensing phase. When the controller is acting as the transmitter of sensing PPDU, a sensing report phase is mandatory. The CIR report may be transmitted via OOB means.”

***Comment Indices 588, 590 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 588 | VERSO, BILLY | 10.40.4.2 | 149 | 12 | I suppose the setup pahse for sensing, exchange capabilities etc, is optional to support? | State that. |
| 590 | VERSO, BILLY | 10.40.4.5.1 | 149 | 24 | "It is negotiated during the sensing session set up phase" or it could be pre agreed OOB, especially if the phase is optional. | and at end of sentence, ", or it can be pre-agreed via OOB means." |

**Discussion:** Agree with the proposed changes.

**Resolution:**

1. CID 588: Revised
2. CID 590: Accept

**Notes to Editor:**

1. **Change page 148, line 12 as follows**

“During the optional session setup phase, a sensing controller…”

***Comment Index 122 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 122 | LEONG, FRANK | 16.4.4 | 240 | 1 | Time domain mask reference is unspecific. | Add specific reference to the sensing time domain mask in Figure 215, noting that satisfying this mask implies satisfying the mask in Figure 16-24.that. |

**Discussion:** Agree with the proposed change.

**Resolution: Revised**

**Notes to Editor:**

**Change page 240, line 1 as follows**

All the pulses within the sensing packet shall satisfy both the time domain mask in Figure 215 and the cross-correlation requirement in subclause 16.4.4.

***Comment Index 279 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 279 | Rolfe, Benjamin | 10.40.4.5.3.2 | 152 | 25 | "shall only" is poor specification practice. In this csae "only" is extraneous.  | Delete "only" |

**Resolution: Accepted**

***Comment Index 249 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 249 | PAKROOH, POORIA | 10.40.6.1 | 156 | 26 | "This applies to sensing and data comm. Please recall them as ""BDP, RDP, SDP"". This is already done in page 157. Please match the figure with the rest of the text in page 157." | In Figure 150 and the descriptions below it, change "RBDP", "RRDP, and "RSDP" to "BDP", "RDP" and "SDP" respectively. |

**Resolution: Accepted**

***Comment Index 609 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 609 | VERSO, BILLY | 10.40.6.2 | 176 | 18 | I think this is still not clear "The CIR taps being reported in the CIR Taps field, i.e., the I and Q (in-phase and quadrature) tap values in the CIR Taps field are divided by 2^F to generate the report." | Change to "The CIR taps, i.e., the I and Q (in-phase and quadrature) tap values in the CIR are divided by 2^F to generate the CIR Taps field values in the CIR report."  |

**Discussion:** Agreed that text improvement is needed.

**Resolution: Revised**

**Notes to Editor:** Change page 176, line 18 as follows:

The CIR taps, i.e., the I (in-phase) and Q (quadrature) tap values in the channel impulse response are divided by 2^F to generate the CIR Taps field values in the CIR report.

***Comment Index 653 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 653 | VERSO, BILLY | 16.2.10 | 220 | 27 | I think this is not the "CIR Report" packet that is being talked about, which is not a PHY thing anways be an optional over-the-ari message, but rather the PHY level CIR data generated by accumulating / cross-correlating with the expected sequence in the sensing receiver. | Change paragraph to "For sensing, in the receiver, CIR data is generated per active SENS segment per active receiver antenna. No CIR data is required from other fields of the packet. CIR data from other (non-sensing) packets may optionally be employed for sensing. The MLME-SOUNDING.request primitive is used by the next higher layer to extract the CIR data for sensing processing." |

**Discussion:** This is indeed about CIR report packet. “CIR data” is not a defined term. CIR report is a MAC thing, but the emphasis of this sentence is from which fields in the PPDU the CIR report is generated, which is related to PHY. For better clarity, we can add a reference to the subclause related to CIR report.

**Resolution: Revised**

**Notes to Editor:** Change page 220, line 27 as follows:

In the receiver a CIR report (as defined in subclause 10.40.4.5) is generated per active SENS segment per active receiver antenna.

***Comment Index 610 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 610 | VERSO, BILLY | 10.40.6.2 | 176 | 22 | I am thinking that depending on how RSSI is measure the range and accuracy of the may be more limited than the units and span of the field would suggest. Maybe we should add something to make this optional, and allow for some imprecision. | Add a note to say that the the range and accuracy of this field may be less than than the units and span of the field specification would suggest |

**Discussion:** The resolution has been discussed and agreed in the group and matches the range and resolution in the baseline 15.4 standard for RSSI.

If a specific implementation cannot meet this, they can report as accurate as they can. Currently there is no text enforcing a specific accuracy, therefore, no need to add a note to mention otherwise.

**Resolution: Rejected**

***Comment Index 247 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 247 | PAKROOH, POORIA | 10.40.4.5.1 | 149 | 18 | Remove the sentence "This type is used for most bistatic and multistatic sensing applications". | Remove the sentence "This type is used for most bistatic and multistatic sensing applications". |

**Discussion:** The sentence is generally unclear, and is not completely correct, as a device can do monostatic sensing and share the CIR report as well.

**Resolution: Accepted**

***Comment Index 591 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 591 | VERSO, BILLY | 10.40.4.5.3.1 | 150 | 16 | The second sentence seems to be repeating what is in the first. | Simply it by replacing it with the following addition the previous sentence: ", and, once agreed, are fixed and do not change." -- or, seems that this may be a mispalced line, in which case the line sentence should be deleted. |
| 594 | VERSO, BILLY | 10.40.4.5.3.2 | 150 | 26 | This line is also pointing to the sentrence on line 16 being wrong. | Delete line 16 sentence. |

**Discussion:**

CID 591: The text is not misplaced, but it can be simplified as suggested.

CID 594: Line 26 is referring to the bitmap itself, while line 16 is talking about bitmap length and offset only. Therefore, line 16 is not wrong and does not contradict with what is stated in line 26.

**Resolution:**

**CID 594: Rejected**

**CID 591: Revised**

**Notes to Editor:** Change page 150, line 14-17 as follows:

“A single CIR window with a bitmap of a fixed length and a fixed bitmap offset value shall be specified for the sensing session. The bitmap length and bitmap offset may be specified through the AC IE, or through an OOB means and once specified, are fixed during the sensing session.”

***Comment Index 248 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 248 | PAKROOH, POORIA | 10.40.4.5.2 | 150 | 20 | Page 150, line 20, start the sentence by adding this snetence: "Support for the Compression of measurement report is optional for an SDEV. Compression, if supported, can …" | Page 150, line 20, start the sentence by adding this sentence: "Support for the Comoression of measurement report is optional for an SDEV. Compression, if supported, can …" |

**Discussion:** The correct line number for CID 248 should be line 2. This is just suggesting reordering the sentences for better clarification of Deflate compression mode is optional.

**Resolution: Revised**

**Notes to Editor:** Page 150, line 2, start the sentence by adding this sentence:

" Support for the compression of measurement report is optional for an SDEV. Compression, if supported, can be used to reduce the size of over-the-air sensing measurement reports.. When compression is used it shall be applied using the DEFLATE compressed data format described in IETF RFC 1951.

***Comment Index 593 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 593 | VERSO, BILLY | 10.40.4.5.3.2 | 150 | 24 | The phrase "The gap options between them" should be a bit cleared what "them" is… | Should it be "The gap options between these mandatory strings of ones are …." |

**Discussion:** Agree that the proposed change improves the clarity of the text.

**Resolution: Accepted**

***Comment Index 601 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 601 | VERSO, BILLY | 10.40.6.1 | 156 | 19 | My understanding is that the AC IE is used in the RCM which by definition (P46L25) is transmitted by a controller in slot zero each ranging round. Saying that it sends the session configuration information perhaps should have some more explanation, since presumably it could change the content and session info any (or every) ranging round it chooses. | Change "The AC IE is used by a controller to send the session configuration information." to "The AC IE is used by the controller in an RCM to send and update the session configuration information".  |

**Discussion:** We do not have explicit definition of RCM for sensing. Also, AC IE is not only sent during sensing control phase, as it can be sent during session setup.

Change to: "The AC IE is used by the controller, during session setup, or during the sensing ontrol phase to send and update the session configuration information"

**Resolution: Revised**

**Notes to Editor:** Change page 156, line 19 as follows:

“The AC IE is used by a controller during session setup, or during the sensing control phase, to send the session configuration information.”

***Comment Index 602 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 602 | VERSO, BILLY | 10.40.6.1 | 156 | 19 | I reckon that while the fields of the AC IE are well defined, the use is quite poorly defined. The AC IE has so many options, one can see how it might cater for multiple modes, applications and uses, but these and its use for them are not described. If a controlee receives an AC IE in a ranging round, when does it change the application use, channel, etc? Is it expected to be on a new channel, doing a new application on the very next slot of the ranging round?. The mentions of AC IE in subclauses 10.32.1, 10.39.4.3, 10.39.4.6.1 and 10.40 seem inadequate to describe the use of AC IE. | Add either one clause on the use of the AC IE is, or separate clauses for each use case, (sensing, ranging, association, changing modes, etc.), to describe when/how often the AC IE is sent, and what part of the content is allowed to change and when should application make the changes. |

**Discussion:** For sensing, the usage of the AC IE is described in various subclause in 10.40. It can be used to provide the parameters needed for control of a sensing session, both during session setup and sensing control phase. This is already specified in various subclauses of 10.40.

 For ranging, subclause 10.32.1 describes that the IE can be used during RCM, and the expected behaviour when multiple IEs conveying ARC IE and AC IE.

Additionally, it is not very clear what the commenter has in mind for the content of the additional subclause, for AC IE. Therefore the proposed change does not seem necessary.

**Resolution: Rejected**

***Comment Index 607 in 15-24-0174-30-04ab-consolidated-comments\_draft\_2.0***

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| **CID** | **Commenter** | **Sub-Clause** | **Page** | **Line** | **Comment** | **Proposed Change** |
| 607 | VERSO, BILLY | 10.40.6.1 | 173 | 2 | Earlier in the paragraph it says "UWB Channel field specifies the UWB channel to use, but for frequency stitching "the UWB Channel field shall be set as the starting channel for sensing", I think that it should not be a "shall" as this IE is UL to UL. Also, "starting channel" is confusing, since there is already a "base channel" in the Frequency Stitching Parameters field. Maybe this is the control channel rather than the "starting channel" | change sentence to "When the Frequency Stitching Parameters Present field in the Sensing Control field is set to one, the UWB Channel field specifies the channel to be used for sensing control messages". |

**Discussion:** “Starting channel” refers to “base channel” in frequency stitching

**Resolution: Revised**

**Notes to Editor:** Change page 156, line 19 as follows:

“When the Frequency Stitching Parameters Present field in the Sensing Control field is set to 1, the UWB Channel field specifies the base channel for frequency stitching .”